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(Hyper)Surface Software in Physics[1] JOSHUA LEITER, CHARLES TORRE, Utah State University — Did you know in higher dimensions that you can have more than one normal vector? This makes calculations of geometric properties of surfaces, for example, more involved and more interesting! These geometric properties have many applications in physics. Some examples of these would be: Minimal Surfaces, the 3+1 decomposition in general relativity, surface tension, classical string theory, and in geophysical fault isolation. Calculations of these geometric properties can be very difficult, so having software tools to calculate them is desirable. Using the "DifferentialGeometry" software I have written a package to calculate geometric properties of submanifolds in any dimension. I have used this package to verify all standard results from classical surface theory and reproduced several results in General Relativity. This software is being used to investigate the construction of interesting examples in hypersurface theory, and to analyze geometric flows such as mean curvature flow. In this talk I will discuss the software and give an explicit example from surface theory and from General Relativity.

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Joshua Leiter
Utah State University

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